What is claimed is:

1. An optical fiber diffuser comprising an optical fiber having a light transmitting core and a nanoporous silica cladding.

2. The optical fiber diffuser according to claim 1, wherein said nanoporous silica cladding is consolidated at a distal end of said optical fiber by heat energy.

3. The optical fiber diffuser according to claim 1, wherein said nanoporous silica cladding is treated with a light scattering compound.

4. The optical fiber diffuser according to claim 3, wherein said light scattering compound is selected from a group consisting of titanium dioxide, aluminum oxide, diamond dust, powdered sapphire, powdered zirconia and powdered quartz.

5. The optical fiber diffuser according to claim 2, wherein said nanoporous silica cladding has been treated with a light scattering compound prior to said consolidation.

6. The optical fiber diffuser according to claim 5, wherein said a light scattering compound has a radial distribution after consolidation.

7. The optical fiber diffuser according to claim 5, wherein said diffuser has a gradient index over its length.

8. The optical fiber diffuser according to claim 5, wherein said diffuser has a step index, having clearly defined refractive index regions over its length.

9. The optical fiber diffuser according to claim 2, wherein said nanoporous silica cladding is consolidated into one or more spirals at a distal end of said optical fiber.

10. The optical fiber diffuser according to claim 2, wherein said nanoporous silica cladding is consolidated into one or more rings at a distal end of said optical fiber.

11. The optical fiber diffuser according to claim 1, wherein the shape of said diffuser is selected from a group consisting of cylindrical, elliptical, spherical, and custom shapes.

12. The optical fiber diffuser according to claim 11, having a cylindrical shape, and wherein a mirror is secured to a polished distal end of said diffuser.

13. The optical fiber diffuser according to claim 12, wherein said mirror is secured and produced by vapor deposition of a reflective metal.

14. A method of manufacturing an optical fiber having integral light diffusers comprising the steps of:

(a) coating a glass core with a silica sol-gel precursor solution;

(b) curing said sol-gel precursor to form an organosilicon polymeric cladding;

(c) recoating and re-curing to achieve a desired polymeric cladding thickness;

(c) heating said cladding to form a nanoporous silica cladding; and

(d) consolidating at least one section of said nanoporous silica cladding to form at least one light diffusion site.

15. The method of manufacturing an optical fiber having integral light diffusers according to claim 14, wherein said step of heating is immediately followed by a step of:

treating said nanoporous silica cladding with a scattering compound.

16. The method of manufacturing an optical fiber having integral light diffusers according to claim 15, wherein said step of treating said nanoporous silica cladding with a scattering compound comprises:

treating said nanoporous silica cladding with a solution containing a scattering compound; and

drying said solution containing a scattering compound before consolidating.

17. The method of manufacturing an optical fiber having integral light diffusers according to claim 14, wherein said step of coating is selected from a group consisting of:

dipping an end of said glass core into said sol-gel precursor solution,

painting said glass core with said sol-gel precursor solution,

drawing said glass core fiber through said sol-gel precursor solution, and

coating said core with an in-line coating application station immediately after said core is drawn.

18. The method of manufacturing an optical fiber having integral light diffusers according to claim 14, further comprising the steps of:

placing a distal end of said glass core into a mold having a custom shape;

filling said mold with a sol-gel precursor solution;

curing said sol-gel precursor solution to form a diffuser precursor;

heating said diffuser precursor to form a nanoporous silica diffuser precursor; and

consolidating said nanoporous silica diffuser precursor into a diffuser having a custom shape.

19. The method of manufacturing an optical fiber having integral light diffusers according to claim 18, further comprising the steps of:

treating said nanoporous silica diffuser precursor with a solution containing a scattering compound; and

drying said solution containing a scattering compound before consolidating.

20. A method of manufacturing an optical fiber having integral light diffuser comprising the steps of:

(a) cleaving a section from a glass optical fiber having a nanoporous silica cladding;

(b) treating said nanoporous silica cladding on said section of optical fiber with a scattering compound;

(c) fusing said section to a distal end of a standard glass optical fiber; and

(d) consolidating said nanoporous silica cladding on said section to form a diffusion site.